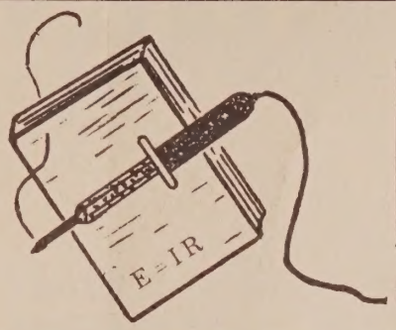
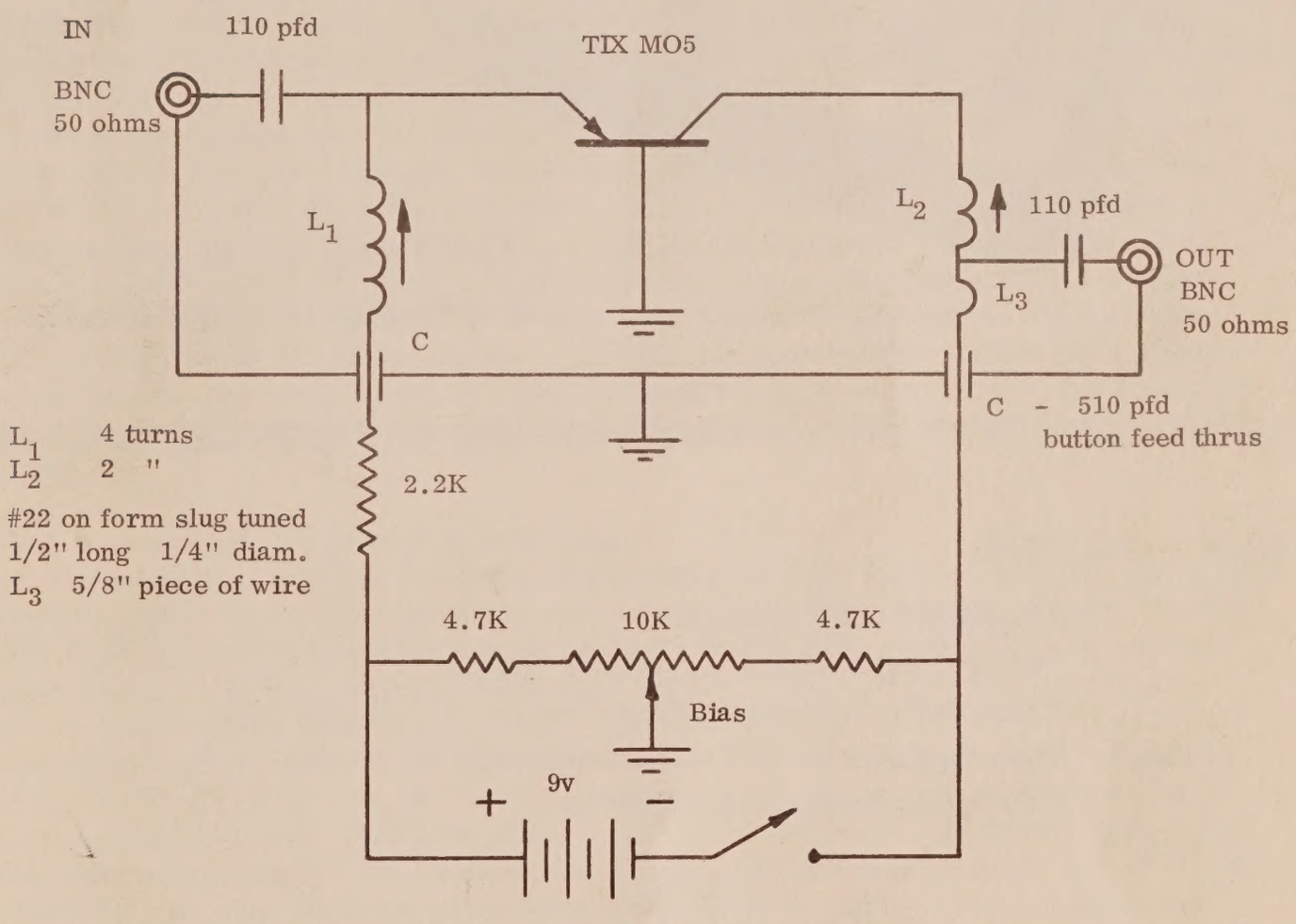


VHFER

LEARN BY DOING

50 MC. AND UP

Volume 4, No. 3 March, 1966

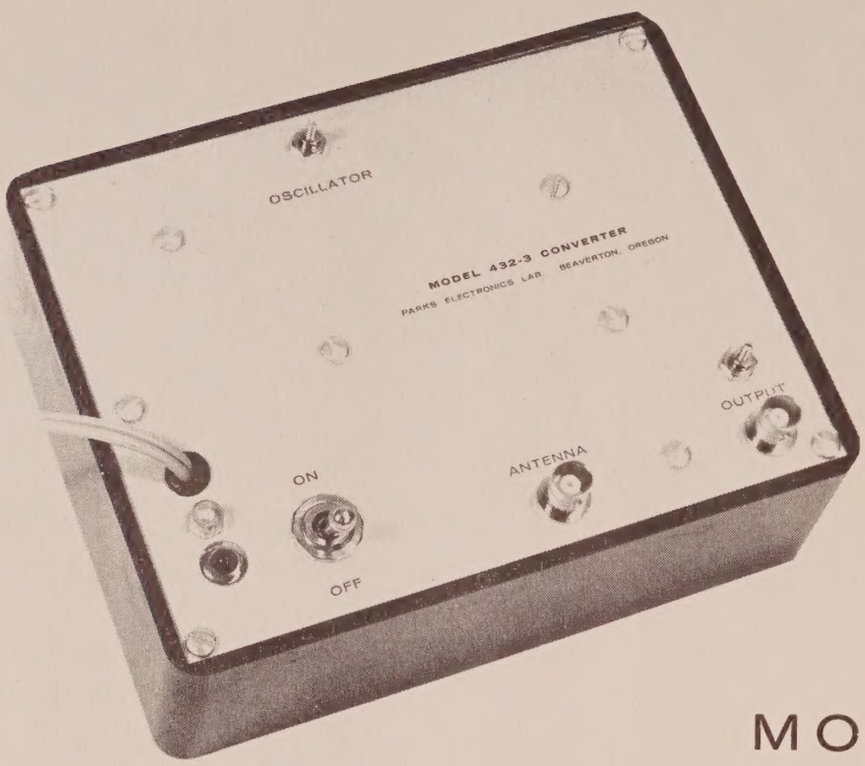


Specifications: (measured by W2IMU & W2CCY)

Noise Figure	2 db
Power Gain	23 db (50 ohms matched)
Bandwidth (-3db)	6 mc.
Total Battery Drain	2.5 mc.
Vce	approx. 4 volts

A 2DB PREAMP FOR 432

A 432 DX MAN'S CONVERTER



MODEL 432-3
$49.95 POSTPAID

INTRODUCING: The new PARKS 432 MC. CONVERTER, Model 432-3.

NEW FEATURES:

--All solid-state design
--Zener-regulated a.c. power supply
--Extremely low-noise front end-- 4 d.b. or less.
--High image and I.F. leak-through rejection
--Excellent frequency stability.

This converter uses the Texas Instruments TI-XMO5 transistor. From our tests it is superior in performance to the 2N3399 and costs much less--less expensive to replace if you damage it with r.f.

ORDERING INFORMATION: Price is $49.95, postpaid. Add 35¢ for Special Handling, a fee charged by the post office for faster delivery. Add $2.50 for Air Mail.

I.F. Ranges available put 432 Mc. at 26, 27, 28.1, 29, 30.5, 49 or 50 Mc.

Type BNC connectors only.

PARKS ELECTRONICS LAB.

ROUTE 2 BOX 35 BEAVERTON, OREGON

Moonbounce Newsletter

by Victor A. Michael, W3SDZ
Box 345, Milton, Penna.

Like the first shoots of flowers through the ground in spring, the first reports are starting to indicate that the 1966 Moonbounce season is about to begin. As reported in the last VHFER, a test was made on two meters between VK3ATN and WA6LET. Here is a brief rundown on the stations that have indicated to me they will be ready to participate. It seems that most interest will be centered on the 432 MC band. While I have one reservation about the use of 432 (antenna size) I would think it is still the best band to consider for amateur work at this time. As part of this column I am writing up a front end that can be used on 432. If mounted at the antenna, it will give you a front end noise figure that is about as close as you can come to antenna temperature limitations. Tubes are available to produce an efficient KW amplifier for 432, and relatively inexpensive low-loss feed line is available. Frequency stability can be accomplished with relative ease. While it is true that all of these advantages exist on two meters, the antenna size for reliable work has to be quite large. 1296 offers the advantage of a smaller antenna, but power output tubes are a problem, and the low-noise front end still requires a paramp. Things are looking better for the higher frequencies, but it will take a year or so for the laboratory developments that are going on right now to filter down to amateur application. Just one example of things to come is a diode mixer that will do an almost loss-free conversion, thus a noise figure equal to the i.f. noise figure. Right now they are getting X-band noise figures of about 3db. As I said in one of the first Moonbounce columns I wrote, the longer you wait for the frequencies above 1000 MC the cheaper and better you will be able to get going.

On the east coast this is what is happening:
K2UYH expects to continue to have available the sixty-foot dish at a military installation in New Jersey for a once a month test on either 432 or 144. K2MWA and the Crawford Hill VHF club will continue to have the use of a commercial 60-foot dish for weekend tests on 432, and have available equipment for two meters or just about any band where someone can show some interest. W1BU, operated by Pat Harris, has a good 432 setup working and can get 1296 gear fired up if someone can get on the other end. Here at W3SDZ we have a new feed which should bring the gain of our 27 foot dish up to normal gain on 432. With a new low-noise front end, we should have a system that can hear echoes about 10db better than last year. We are getting ready to replace the feed now, and after the usual calibration and echo tests, make schedules sometime in May.
In the Midwest: W9HGE still has his 432 setup going with a 20-foot dish. W8ROF writes that he has a 384 element driven array ready to go on 432.

In the South W4HHK still has the 18 foot dish up, and has mounted a transistor preamp at the feed point for listening tests on 432.

I have many unconfirmed reports of several new 28 foot dishes ready to go in Conn. and Mass. Also have reports about several other building projects, but nothing definite at this point.

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What I am about to write about now will undoubtedly raise some eyebrows--in fact some will disbelieve it until they try it. A group of amateurs here on the east coast developed a transistor preamp that will give a noise figure under 2 db on 432 Mc. The transistor costs 52 cents. As you can tell from the circuit and the picture, it is an extremely simple device to build. The amplifier has now been duplicated a dozen times with identical results every time. I have purposely delayed writing about it until now, as we wanted to be sure that it did what we thought it would do. It has now been checked by three separate labs with good commercial noise figure measuring equipment. In every case the number 1.8 db has been the result of the measurement.

As far as construction is concerned, the only point that is really important is the use of a transistor socket and relatively long emitter and collector leads. In other words, don't try to improve the layout shown in the photos.

The use of the preamp is where the catch comes in. This device is regenerative and behaves in a negative resistance manner. The input and output of the preamp must look into a matched load. It appears from all tests that a 6db reflection loss is adequate for most purposes. If you are doing any really serious 432 work, you should have a matched antenna (VSWR less than 1.5 to 1.) A 3db pad between the preamp and converter will provide the match on the output. The gain of the preamp is about 23 db and a 3db bandwidth of 6MC. More gain can be had, but noise figure starts to degrade. The best operation can be obtained with around 20 db gain.

With a good noise generator on the front end (52 ohm), adjustment is as follows: Feed some noise from the noise generator into the front end. You must then accomplish the most difficult adjustment, the adjustment of the collector tuning and the bias pot for maximum noise output. Then begin to try variations of emitter tuning for best noise figure. On the first try, it may take you a half hour or more to get the feel of how to tune it up. You might be able to make things go without a noise generator, but you will need at least a sweep generator or a weak signal source. The noise figure always seems to come out once the 20 db of gain is realized. Also be sure you don't let the preamp take off into oscillation.

The best precaution to take in the use of the preamp is to use two antenna relays as indicated in the diagram. This will prevent the preamp from going into oscillation when the antenna is switched off during transmit operation. While we aren't sure yet whether this is really necessary, it will make things simpler. We are going to mount ours at the antenna in a weather-proof housing. We presently have a .7 db feedline loss, so this means that we would have to have a 1db front end in the shack to equal the performance this preamp can give.

This preamp is simple to build, is inexpensive, will produce a noise figure under 2db with 23 db of gain for a single stage--in exchange for these advantages initial tuneup takes a little care and measurement to insure operation according to specs, and the antenna match must be good. Overload of the device from strong local signals might also be a problem, but for serious weak-signal work it is a device that comes close to the best commercial practice at a price that won't break your pocketbook. With transistors, as you probably know, accidents with RF can blow them or degrade the noise figure in short order. To replace a fifty-cent transistor isn't nearly as heart breaking as a 20-dollar job. These epoxy transistors do break easily so you must be very careful about bending the leads.

The TIXMO5 is in current short supply. I have a quantity on order from Texas Instruments that should be here by the time this column is printed. If you have trouble getting them from regular sources, I will also be able to make them available at two for a dollar. Include postage sufficient to cover shipment to your area.

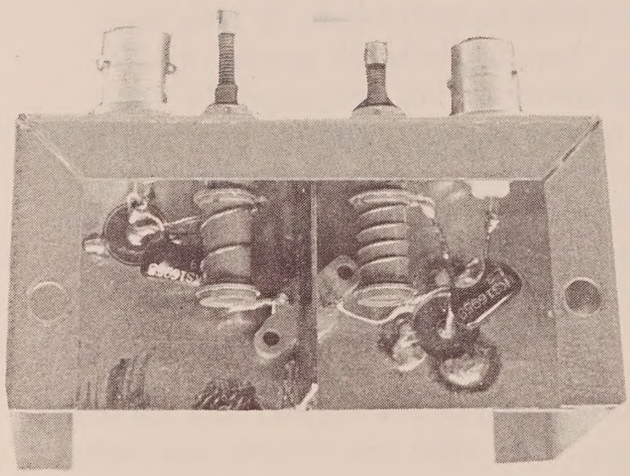
Credit for the development of this amplifier goes to the following people: W3VSV who came up with the original circuit, W2CCY and W2IMU, who did further development and testing of the circuit before making duplicates for the people who were interested , such as your writer.

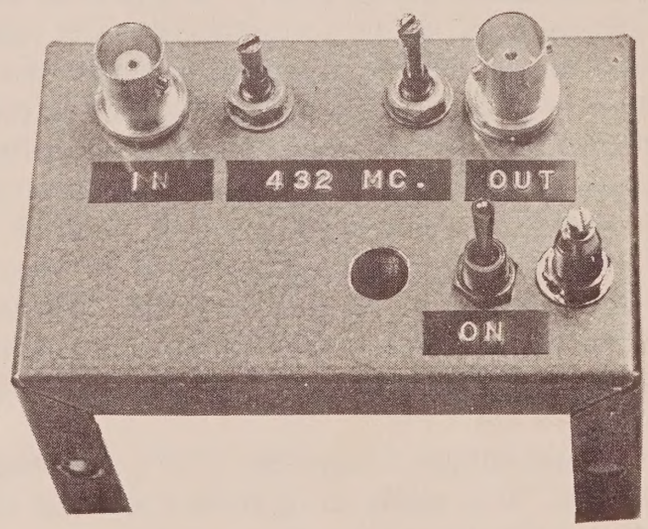
Are you ready to moonbounce? Write me so I can put you on my mailing list (no charge) that will announce all of our schedules, and schedules of any other tests I know about, by first class or airmail. Please don't ask to be on the list unless you are ready to go.

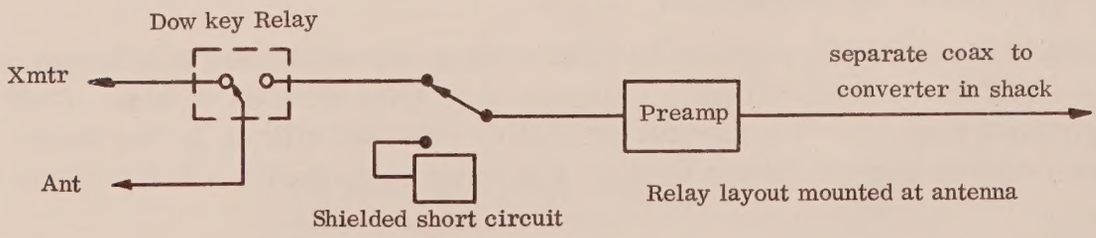
The diagram of the low-noise 432 preamplifier and its specifications are on the cover.

Tune Up:

Adjust L_2 for max. response (it alone controls center freq.)
" L_1 " best N.F. (very broad)
Set bias adjustment for max. gain
Input - Output impedance should be near 50 ohms resistive
Amplifier is conditionally stable without input termination
Input Termination must have reflection coeff. >6db for stability







THE W2CCY QUAD YAGI ARRAY

There have been so many unsuccessful yagi arrays tried on 432, that it would be easy to believe that a yagi won't work at 432. The results that W2CCY has achieved with his relatively small yagi array prove a yagi will work if you do the job right. Cliff started off with the design in the Bill Orr VHF Handbook. A measurement of the yagi built from the book dimensions produced an antenna that worked fine at 427 MC. I suspect that this is the greatest problem of long yagi design at 432; i.e. commercial antennas are not cut and tuned to 432, but rather are designed for some compromise frequency in the hope they will cover the whole band. After some careful measurements, Cliff has found that the yagi can only work over a bandwidth of less than 1%. At any rate, the dimensions given here are for 432.000. Cliff made several modifications to the basic design--measured and tested each modification--until he produced one very good yagi. The stacking was done in such a manner that each yagi is completely decoupled from the others. By using this philosophy of stacking, the feed impedance doesn't change when the antennas are stacked. This is important in order to hold the phasing line losses to a minimum. Figure 1 pretty well tells the story of how to build the yagi. At each yagi Cliff uses a regular coax balun to step the impedance down from 200 ohms to 50 ohms. Then, fifty-ohm coax lines are run from each yagi to a common matching point. Each line is a multiple of a half wave on 432, and about 6' long. This guarantees that the 50 ohms at each antenna will be transferred to the matching point. Cliff measured each line on a slotted line to match the lines within 1 degree. Actually about ten degrees difference in the lines can be tolerated. One interesting point about the baluns. The half wave phasing line part of the balun is made from RG59U. I questioned Cliff about this, since convention would have used fifty ohm coax and something of larger dimension. First off we examined the theory of the balun. If you do this, you will find the actual impedance along the half wave section of the balun is actually half the antenna impedance--in this case 100 ohms. Cliff could not locate any suitable 100 ohm coax, so he settled for 73 ohm cable. Since the loss in this phasing section goes up with VSWR, it can be seen that the 73 ohm coax is better than 52 ohm coax. Since only a half wave section is used in the balun, loss in the balun is very small. Next problem--it's power handling capacity. The power in this section of the balun is one half the total power being delivered to the individual yagi, and the power delivered to each yagi is one fourth the power out of the transmitter. When Cliff completes his ultimate full size yagi array of 24 yagis , only one twentyfourth of the total transmitter power will reach each balun. These baluns can take all an amateur can feed to them when used in this fashion. If you plan to use a balun of this type at the main feed point of your system, you have a completely different problem.

The most unique thing about Cliff's matching system is the power divider and matching section. It is made up of stock type coax couplings. You must use exactly the parts specified in figure two for everything to come out right.

The length of the fittings is an electrical quarter wave which transforms the 25-ohm impedance of the two lines from one bay of yagis to 100 ohms at the T connector which joins the two bays. The two bays in parallel then equal 50 ohms which matches the transmission line to the transmitter.

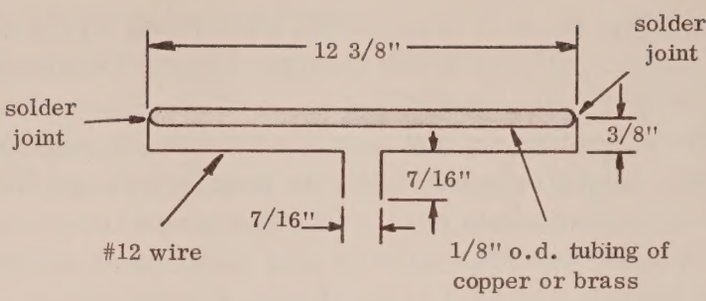
If you would like more information on Cliff's plans for expansion to a larger array using the same basic yagi element, I suggest you write directly to him. Cliff is an excellent worker on 432. He devotes his entire amateur efforts to this band. Cliff works as a commercial engineer by day, and takes a busman's holiday by his amateur efforts.

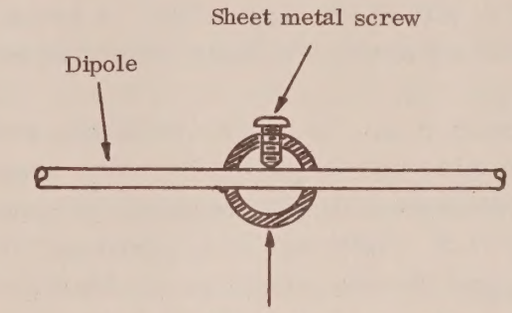
We have uncovered much to write about from our visit with W2CCY which will fill many columns in months to come.

Fig. 1 W2CCY 432 YAGI

	Element Lengths	Spacing from Dipole
Reflector	13 3/8	6 1/4"
Dipole	12 3/8	--
Director #1	11 15/16	2 11/32
2	"	4 27/32
3	"	7 11/32
4	"	12 5/8
5	"	23 1/4
6	"	33 7/8
7	"	44 1/2
8	"	55 1/8
9	"	65 3/4
10	"	76 3/8
11	"	87

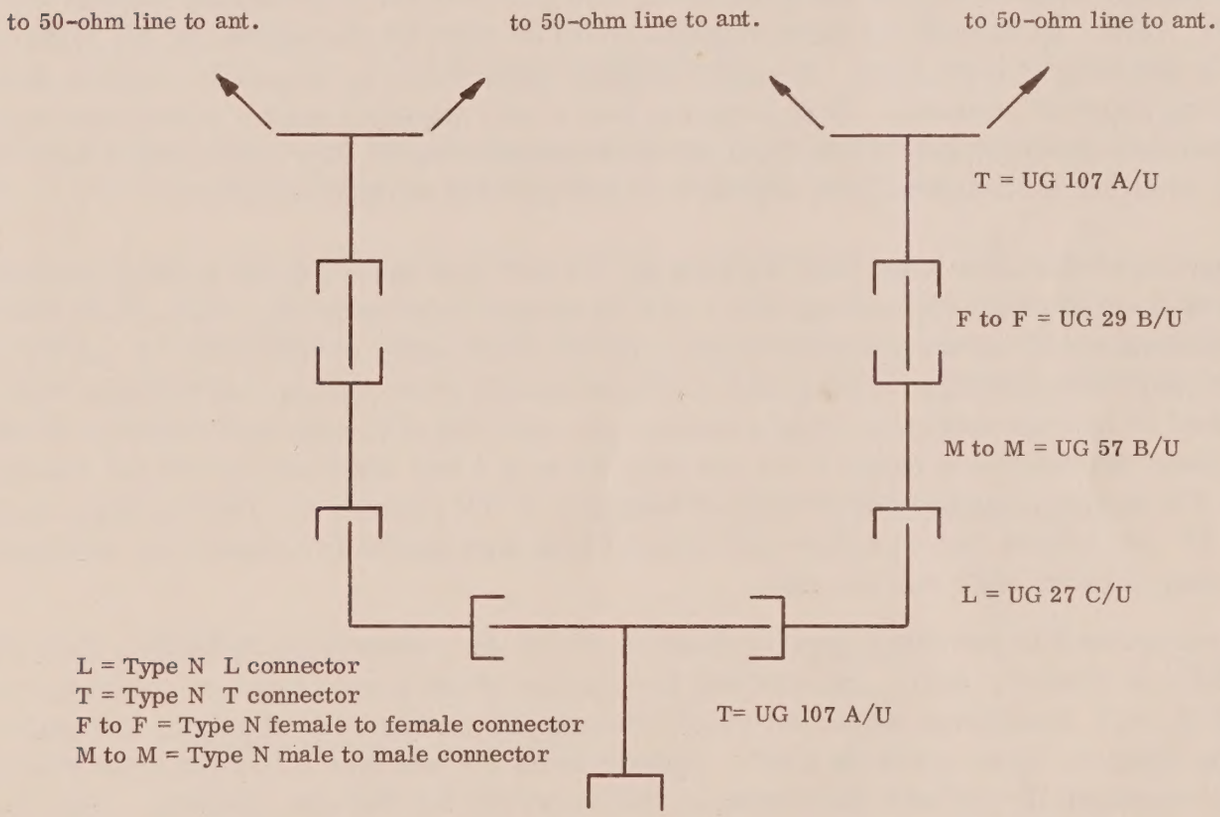
All elements except the dipole are 1/8" alum. rod.





Boom 8 ft. long alum. 1/16" wall, 1/2" o.d.

Method of fastening elements to boom.



Power divider and matching network. For larger arrays, additional networks can be added to each output port of the above network.

Figure 2.

continued on page 9

METEOR SCATTER OBSERVATIONS

by George A. (Al) Olcott, K7ICW/AA7ICW*

Meteor scatter or MS is going thru the annual doldrums this time of year. Except for minor showers, very little is usually accomplished until the Lyrids in April. The recent Leonids shower in Nov. 1965 has given this "sport" a shot-in-the-arm, but most avid fans know that this shower was an unusual one in that such conditions are not expected, and that this showing was the best in 33 years. Of course MS was unknown 33 years ago. Only a decade ago early amateurs in this field, including W2UK, W2AZL, W4AO, W4LTU and others, paved the way. Now, a reasonably set up station with only a fair CW ability can do well on major showers even without a KW rig.

What is needed now is more accurate predictions and utilization of these predictions, so that greater participation by more amateurs in "scarce" locations can be attracted. What constitutes a scarce location is open to question depending upon where you are, but in the U.S. right now it is Idaho and North Dakota. Additional activity in Washington, Wyoming and Nevada might be desirable.

Methods of predicting when MS is usable is still very much a guessing process. There are valuable guides such as Sky and Telescope Magazine or articles in various ham publications showing charts of showers and path times. None of these publications in my experience has been more than 50 per cent reliable and such data is highly interpretive Visual observations are generally worthless, because many showers occur in the daytime, and local weather conditions maybe adverse at night. Even then, only the overdense or very large meteors will be seen. Only one outstanding example of visual observations of a meteor shower can be recalled here, and that was the Giacobinids shower of Oct. 9-10 1946. Thousands of meteor trails could be seen by the naked eye all night and early morning of both days. If such a display again occurs, naturally signals should be nothing short of fantastic. It is recalled that a mid-western plains states amateur correlated visual observations with received signals on 50 mc. some years ago, but that situation is suited to ideal weather conditions and a rural location.

Along about the same time that Walt Bain, W4LTU and others were fooling around with this meteor stuff on 2M several eons ago, Stanford University (N. Calif.) was playing around with a 49.9 Mc. scatter circuit with the University of Montana. It isn't clear what they were trying to accomplish, but the circuit was regular and reliable and one method of meteor detection supplementing the equipment to accomplish the path comes to mind. Stanford was using a TV set coupled to a 4 bay stacked conical for reception of a TV station near the University of Montana on TV channel 2. During burst periods, the TV set indeed had a picture and sound which was useful for observing multipath effects, doppler shift and the like.

TV reception can provide a good indication of 144 Mc. shower probability. Bob Turk, W7LEE of Parker, Ariz., showed me his method about 4 years ago of utilizing a UHF M.P.T.A.I. translator which provided Phoenix TV on the VHF channels 150 miles away to the Parker, Ariz. area on UHF. Signals from TV stations other than the Phoenix area occasionally get into the repeater and override the Phoenix stations. This happens more often with sporadic E type signals, but when meteors are good, reception of TV signals in the 700-1500 mile range are received on bursts. Since the repeater is automatic, any signal received on the input 24 hours a day will key it on. Sometimes meteor showers key it on and off at a rapid rate.

* 510 So. Rose St., Las Vegas, Nev.

Don Hilliard, WØEYE of Boulder, Colo., has been using TV channel 5 as an indicator of MS activity. A channel 5 yagi has been used on his set to receive WMAQ, Chicago, Ill., WOI-TV, Ames, Ia., and WFRV, Green Bay, Wis. Actually any low TV channel will work for this purpose but channels 5 and 6 are best due to their proximity to the 2 meter band. A yagi or fairly high gain and directional antenna is necessary for this reception normally, with the yagi being best due to its frequency/bandwidth characteristics. TV sets with one I.F. stage or economy construction as used in some portables are unsatisfactory for this work. Poor noise figures, low stage gains, and poor sync stability contribute to mediocre results.

A study of TV station log listings such as Whites Radio and TV Log incorporated in Radio and TV Experimenter magazine would be desirable so that identification of on the air stations in specific directions can be achieved.

Other methods of MS activity identification need to be developed. Merely being in a TV fringe area is a big help when using the TV method of MS detection. A better approach is to improve equipment so that smaller but more frequent meteors may be utilized for amateur communications. European work along these lines consists of better use of diversity reception, little used in the U.S. Merely improving noise figure or raising antenna height is only going to increase effective range by a few hundred miles (a considerable factor to advanced MS amateurs) but will not get results during a poor shower or no shower as the case may be. Advanced MS enthusiasts are utilizing the minor meteor showers or periods of daily meteor increase such as sunrise, or combining MS skeds with likely tropospheric paths and not waiting around for the "band to open". End.

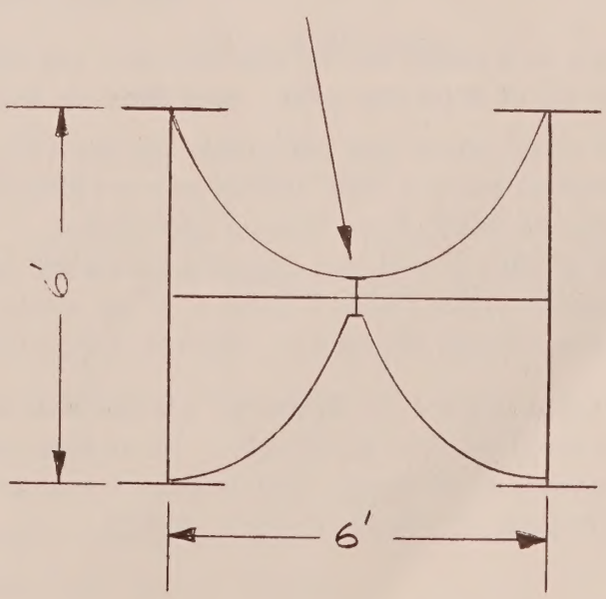
432 SKEDS WANTED

Ed. note: We don't normally list skeds wanted from such low power stations, but Doug's record of accomplishment was so outstanding we thought he deserved it. LP

"I operate 432 Mc. only with ten watts to a 6939 and a 128 element colinear antenna. So far I have N.Y., Pa., Mass., N.J., Ohio, Mich., Wisc., Ill. for eight states plus Ont. and Quebec. I would like to make skeds with anyone that is interested in early morning or daytime operation thru the week this summer or fall." D.M. Armes, K2ACQ, 5681 Locust St. Lockport, New York 14094.

Power divider network

Basic stacking of 4 antennas.



OPEN BANDS

by Marilyn Wiseman, K8ALO

Reports have dropped off considerably. Could it be everyone has spring fever so early? Maybe the old flue bug has a lot of you. I sure hope not. I spent 3 weeks in bed myself with it. I can't write a column without reports. Maybe all reports haven't appeared, but I do take the best from all letters received, as space is limited. So let's get on the bands, work, listen or do something and get those reports to me by the 15th.
My address: Box 103, Petersburg, Ohio 44454.

50 Mc. Scatter

February's activity seemed quite slow. However the following stations did send reports:

K7ICW (Nev.) wrkd K6YIL, K6ZOA, W6YKM, WA6SUU/6, WB6LJN, K6RIL, WA6TXH, K6IBY, W6NZY, K6GJD, W6ABN , K5OOJ W5UNU, WA5CDG/5, K5JFW, W5SFW (Texas), WØEYE (Colo.), K7BBO (Wash.). Hrd W7HDP (Mont.). Al also reports hearing the 49.8 Mc. signal from Stanford's big dish. This station is on from about 5:30 a.m. to 5 p.m. running lots of kilowatts, every day but Sunday .
WB6GKK workd K7BBO (Wash.), K7ICW (Nev.), WØEYE (Colo.), W5KCP (Tex.), WB6FSC.

144 Mc. (Minimum distance for listing 350 miles)

Feb. 6-27 K7ICW (Nev.) wrkd W6NLZ, W6YVO, K6JYO. These were weekly contacts.
Mar. 13 WA2WEB, the East Coast VHF Soc. Radio Club of Paterson, N.J., reports working the following: K1BKK, W2PTI, VE2BMQ, VE2TT, VE3ETO, K4GL/8 WA9ADM/8, K8UQA, W9BRN. Hrd K1OYB, K1TIC, K1VDZ, W1AEP, W1BMX, W1EKU, K1MTJ, W2LWI, K2HLA, W3BYF, W3MBN, W3PMG, K8AXU, W8WEN, W8EDV, K8MPH, W9ZIH, VE2FF, VE3EVW, VE3FRC. Operators working the club station were K2LME, WA2INB, WB2NCB, WB2OHH. As far as I can figure, a total of 9 states plus 2 canadian sections.

432 Mc.

K7ICW (Nev.) reports hearing Oscar IV throughout the month. Al copied his own signal through the translator at 1135 Feb. 19.

432 MC. TRIPLER PARTS KIT

Here is a parts kit for the 432 Mc. rig described in the September, 65 VHFER. You can buy all of it or any part. And there's some rigid coax you can put with it if you want.

Kit of all parts and materials except 4X150 tube-----$40.00
Same as above, less blower ----- $30.00
Same as above less blower and socket ---- 20.00
432 tripler wired and tested with 4X150 tube supplied by buyer, no blower ----$40.00
Blower--100CFM 115 volts a.c. 60 cycle ----$10.00
Prices shown above are prepaid, parcel post within the U..S.

50-ohm rigid 7/8" diameter air dielectric spiro-line coax. Approx. 1 db. attenuation per hundred feet at 500 Mc. Maximum coil lengths are 50 feet. price is 25¢/foot, f.o.b. Beaverton, Oregon. For tripler kit or coax., write Deane Kidd, W7TYR, 12235 S.W. James St., Tigard, Oregon 97223.

1296 CONVERSION OF THE "ARROW" CAVITY

by Pete Bauer, W6DXJ*

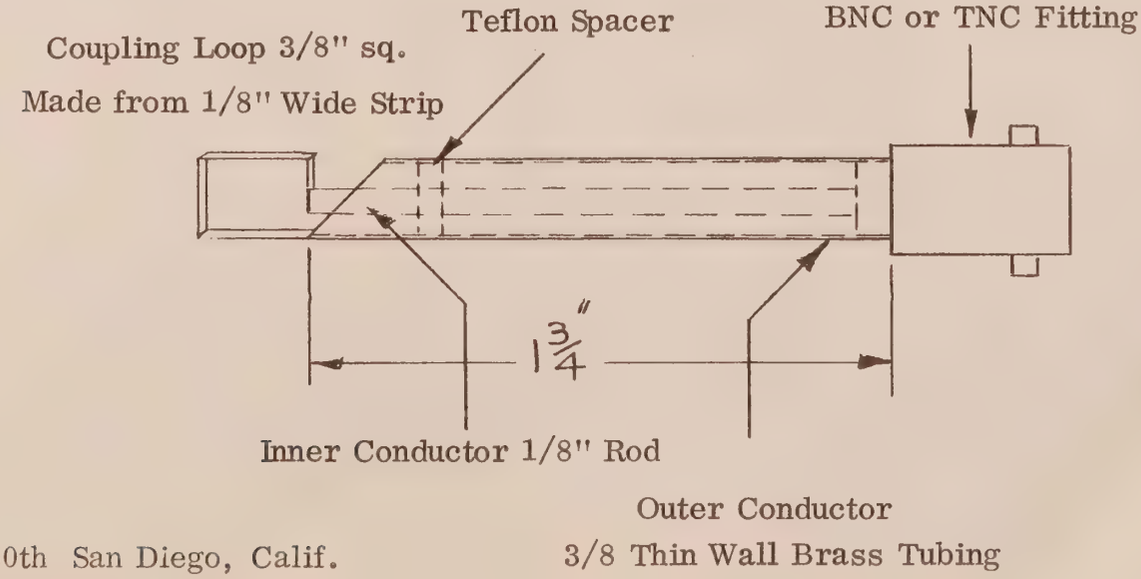
Arrow Sales of 2534 S. Michigan Ave., Chicago, has a 2C39 "Tripler Cavity" for $3.95 that is readily converted for operation at 1296 Mc. It can be operated either as a tripler from 432 Mc. or as a straight-through amplifier with as much as 17 db small-signal gain. The gain is about 8-9 db as a class C amplifier and about -3 db as a tripler. At the time this article was written they had about 50 units in stock at Arrow so there should be enough to go around.

The output cavity must be modified for operation either as a tripler or as an amplifier. It was originally designed to tune from 1.1 to 1.2 gHz (KMc.), but with the original filament chokes the tripler oscillates. This is probably why it hit the surplus market. The original chokes are about right for 6 meters.

OUTPUT CAVITY MOD. FOR USE AS TRIPLER OR AMPLIFIER

1. Disassemble
2. Unsolder the outer shell and grid contact ring. They are soft-soldered.
3. Shorten the inner conductor exactly 3/8 inch.
4. Remove 3/16 inch (NO MORE) from bottom edge of the outer shell.
5. Cutt off the top of the shell to make a final length of 2 1/4".
6. Remove the output coupling tube which is adjacent to the terminal strip by sawing it off. Solder a metal disc over the hole.
7. Cut the plate bypass down to 1/2". Save the teflon tape.
8. Remove the ferrite beads from the plate feed cable and save for later use.
9. Resolder the grid ring and outer shell maintaining the original offset referenced to the top of the line on the grid ring.
10. A 3/8" spacer must be used between the output cavity and the mounting bracket to preserve the cathode-filament circuit. (This is easier than shortening them 3/8")

The output coupling link terminates a short section of rigid coax made from 3/8 inch thin-wall brass tubing. The 3/8" tube telescopes into the remaining original output tube which may be crimped slightly to make a snug fit. The link protrudes into the output cavity and can be rotated for variable coupling. The figure below shows how the output coupling assembly is made.

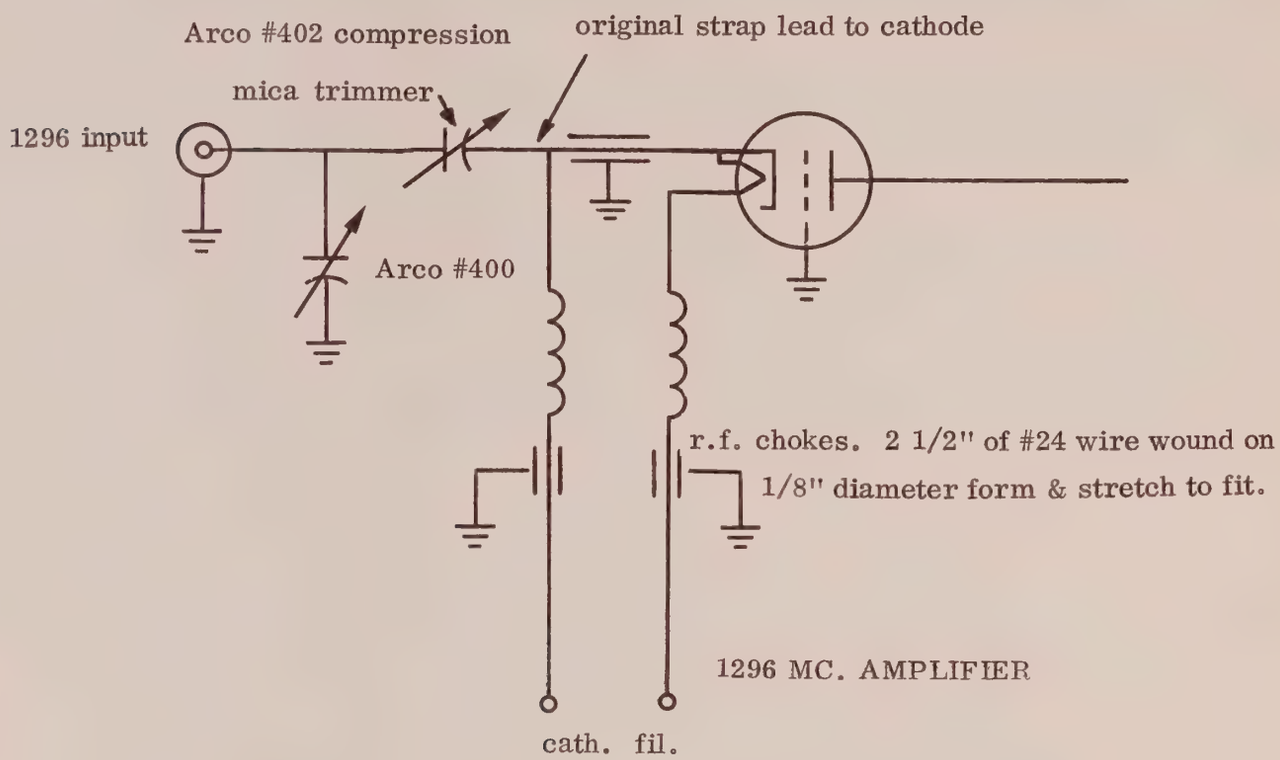


*6445 50th San Diego, Calif.

INPUT BOX MODIFICATION FOR AMPLIFIER OPERATION

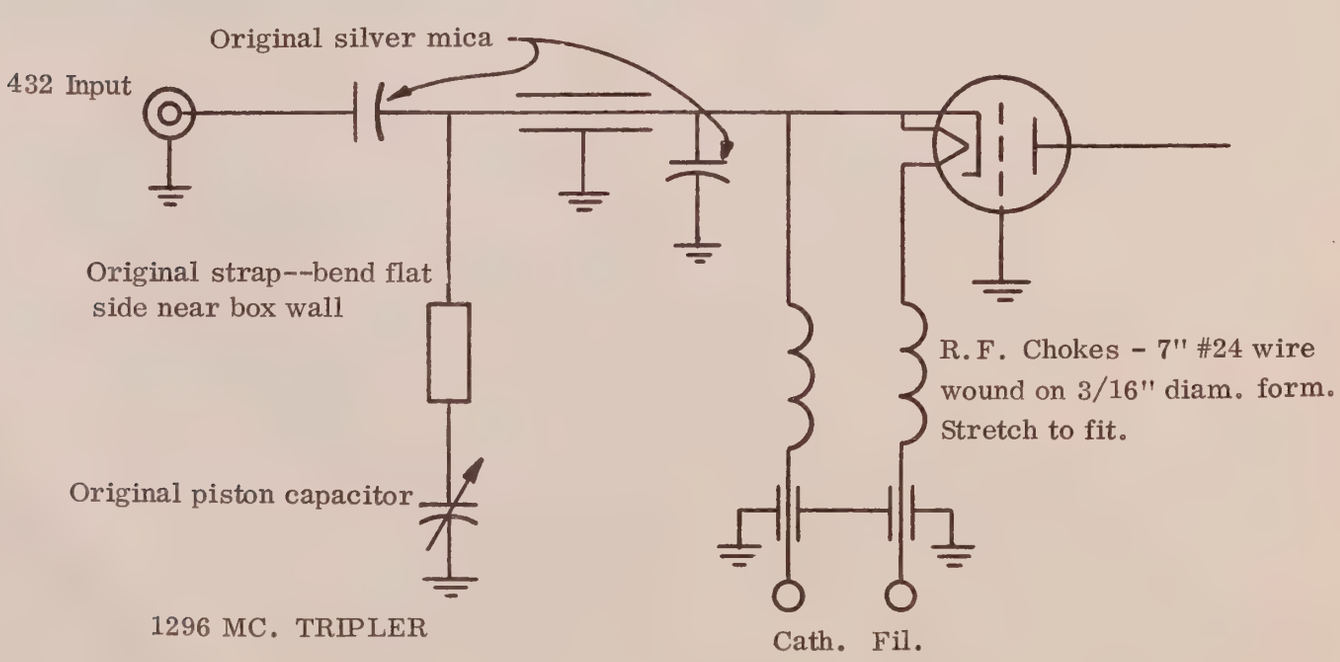
1. Remove all the components except the BNC fittings and the feed-through button mica capacitors from the input box.

2. Rewire according to the diagram below:



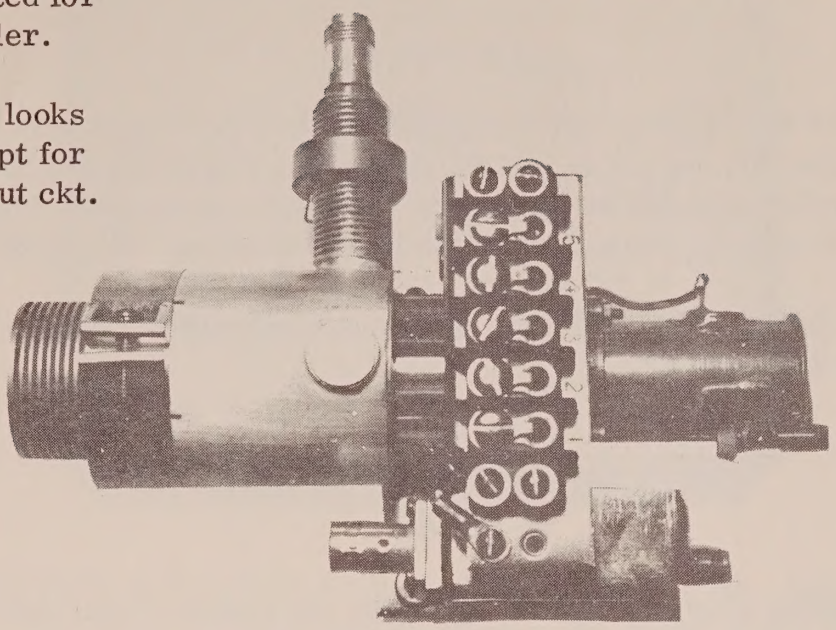
INPUT BOX MODIFICATION FOR TRIPLER OPERATION

1. Remove all resistors and chokes from the input box and the tube.
2. Remove the Johansson piston capacitor and silver-plated strap which connects directly to the BNC input fitting.
3. Rewire according to the figure below:

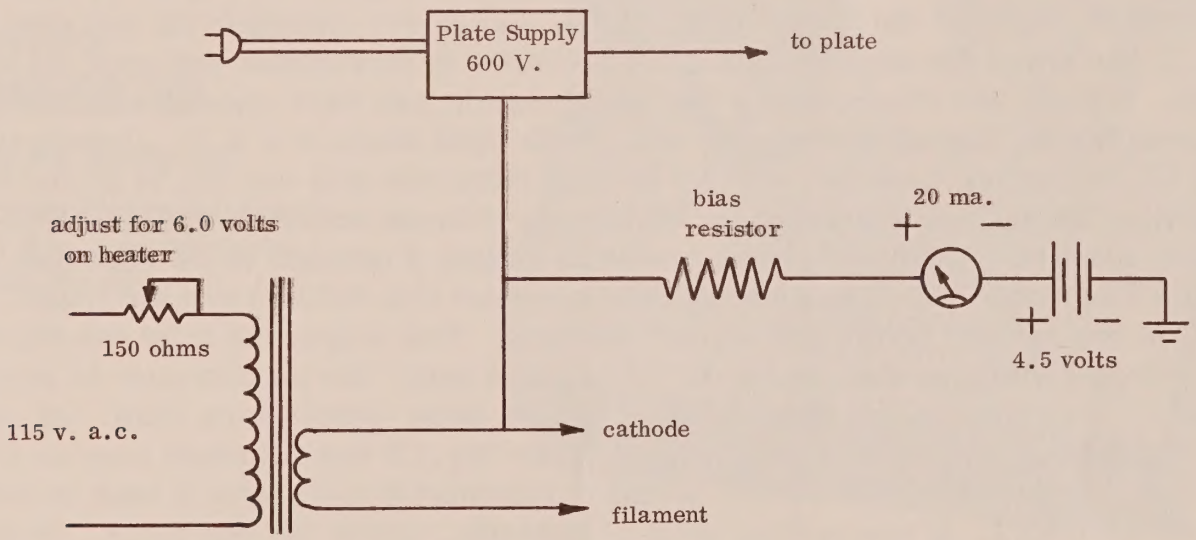


Cavity converted for 1296 Mc. tripler.

The amplifier looks the same except for a different input ckt.



The figure below shows how supply voltages are connected to the 2C39 or 7289. Since the grid is directly grounded, bias must be placed in the cathode circuit and a plate supply with un-grounded B- used. The grid bias resistor will be approx. 200 ohms for amplifier operation and 10,000 ohms for tripler operation. For proper operating bias it is best to refer to the manufacturer's data for the tube type you are going to use. Be sure to consider the cooling requirements. You will need a high-speed (7000 rpm) 2" squirrel cage blower and shroud for 100 watts dissipation.



BACK ISSUES

We still have bundles of 11 back issues of 6-up magazine available for $2 postpaid. Also we have all VHFERS for 1965 except Jan., April and May. Some of these are being reprinted and those of you who ordered but didn't receive will ultimately get them. Price of back VHFERS is 20¢ each, postpaid. Send cash, check or stamps in payment. If you have any questions about back issues send self-addressed card or envelope for reply.

CORRECTIONS

We offered TI XMO5 transistors last month but the delivery promise to us turned out to be N.G. so we have none for ourselves and all money has been refunded that was sent us. Our latest delivery promise is April 26 but maybe we can't rely on that. We have been using the TIX MO6 and find it equally as good or better in our circuits. We don't have enough to sell.

We made an error in Feb. VHFER in the slotted line conversion article. Figures 3 & 5 were inadvertently interchanged.

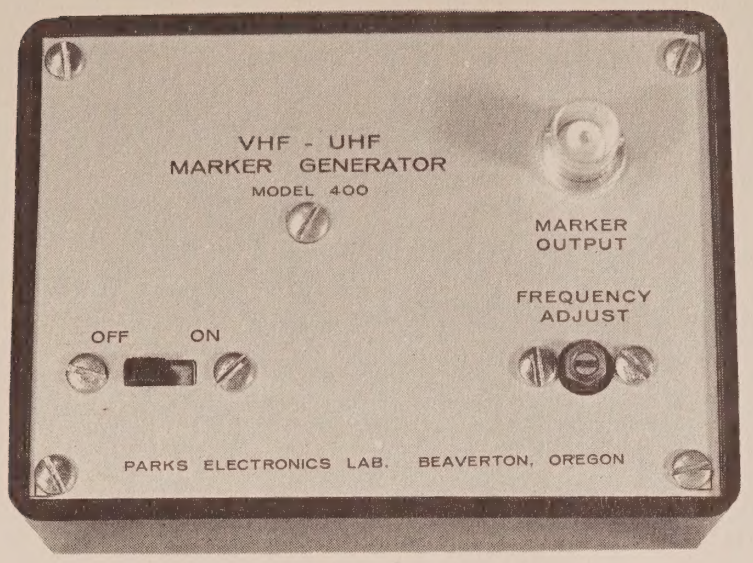
A FANTASTIC 2-METER ANTENNA
by K7AAD

Some people are awfully slow to get the word--like ten years. Count me among them. My interest in Yagi antennas has been high for the last few years and I pretty much know what has been published and don't hesitate to venture an opinion on the articles. Most of them stink, even though written by "commercials." It's amazing how their theory and complex equations manage to produce antennas with outlandish claims and equally poor performance, for the most part. At any rate one article in QST some ten years ago by Kmosko and Johnson stood out like a sore thumb. It was good work, no doubt about that. But the antennas looked awfully big. I found out recently how wrong I was about that. Here is how W7UAB carried the ball and forced me to wake up.

For two or three years we have been trying to break down the 2-meter path between Portland and Calif. W7UDM did it once with a Calif. station on a mountain top just over the border. I had heard discernible signals from W6GDO in Sacramento just once out of many attempts. W7UAB and others locally had heard signals that were copyable at times but nothing was getting through to the other end. With legal limits of a K.W. already attained and RG-17 U or better feedline , W7UAB decided there was only one way to go and that was the antenna. He too was impressed by the Kmosko-Johnson article in Jan. 56 QST, and did something about it. There were some problems getting it matched to the coax line, but eventually a tolerable match was attained and a contact with W6GDO was the result. This on the first attempt and on two subsequent attempts. Tom helped me build one which went up about 45 feet with a preamp under it. The article said, "the performance is something to behold." They were right. What a shock to hear those signals from Calif. Q5 -two of them at the same time (W6GDO and WB6KAP in the bay.) It was armchair copy on c.w. W6GDO made a recording of W7UAB's signal in Sacramento and played it back on our Sunday night VHF NUT NET. It was nothing short of fantastic. Every dot was there. No need to imagine anything. Both Jay and Vic used 15 element Telrex beams. The fellows here still using the 12 db antennas could not copy calls.

Now what's happening? The 12 db antennas have an honest, measured 12 db over a dipole. The Kmosko-Johnson antenna can't have more than 4 db over that. But the difference in reception was more than any 4 db. We don't know the answers yet. We have not measured the antennas yet because we still have some matching problems. The booms are 23 1/2 ft. Really, they aren't the monsters you would think. Materials cost is about $8. They are very narrow band devices. We swept mine and at 145 Mc. it was pretty much gone to pot.

The distance of some 500 plus miles may not impress you flatlanders. But our propagation isn't like yours. We don't have two meter openings except to Seattle that we know of. By next issue we'll know how often this can be duplicated. But with the other listeners serving as controls it seems pretty clear, its a fantastic 2-meter antenna. More next month.

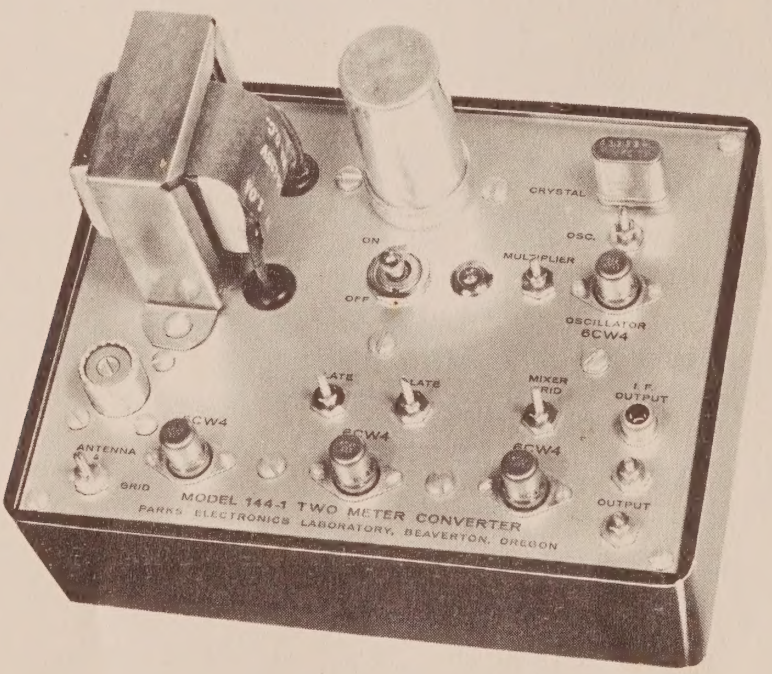


This marker generator puts out harmonics of 1 Mc. from 2 Mc. thru 1296. It uses a 1 Mc. crystal oscillator driving a tunnel diode. The tunnel diode switches at a very fast rate generating strong harmonics every 1 Mc. (the switching rate). Adjust against WWV and be sure of band edge calibration and 1 Mc. intervals. Can also be used as a weak-signal source for adjustment of antennas & converters. Operates from self-contained penlight cells. $25 postpaid.

Nuvistor
CONVERTER

$54.95 postpaid

- Noise Figure less than 3 d.b. over full 4 Mc. Bandwidth.



Here is the converter that has been accepted by advanced hams all over the U. S. A proven performer for weak-signal work. I.F. ranges available put 144 Mc. at 7, 10, 14, 21, 22, 24, 26, 27, 28, 30.5 or 50 Mc. Choice of connectors: UHF in, phono out (shown) or BNC in and out. Available from stock.

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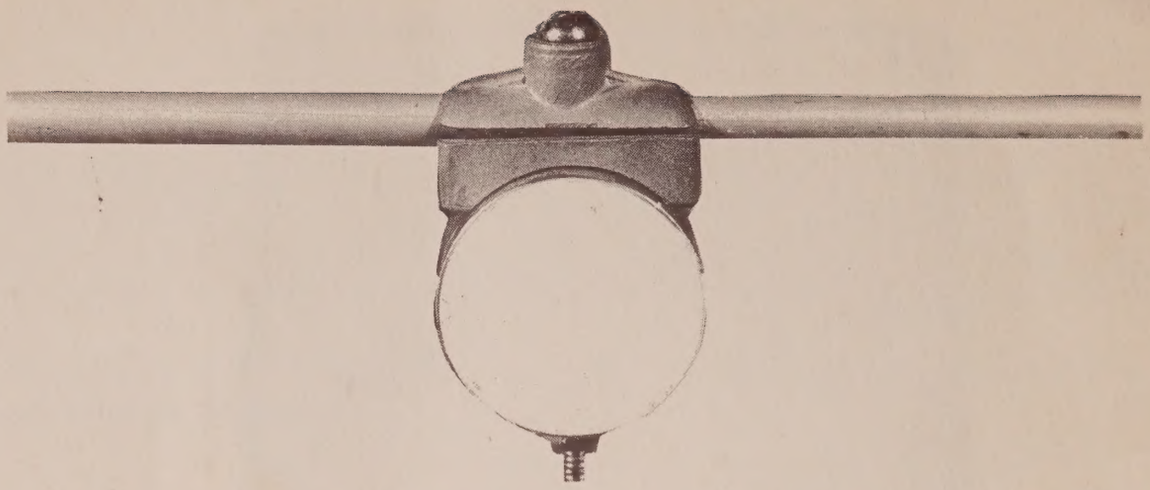

ANTENNA ELEMENT MOUNTS

If you like to build your own antennas, consider these mounts which will make your antennas more rugged and easier to build. An antenna made with these mounts is a whale of a lot easier to tune because you can change element spacing easily. Otherwise you have to drill big holes in the boom and just guess where the element would work best. Remember that on a Yagi there is an optimum element length and element spacing for maximum gain and a given element and boom size. Adjustment near the driven element is very critical. When you can move the elements along the boom and note the immediate effect on gain, you can easily see when you're getting somewhere.

Element mounts are in two pieces with holes in the middle that pass the mounting screw. Mounts are die-cast from Zamac and are iridite treated to resist corrosion. They are RUGGED. My 6-meter beam came down and broke the boom, but not the element mounts. I've never seen a broken one yet. The upper part has a V contour so it will fit snugly over elements from 3/16 to 3/8" in diameter. The bottom part fits 1 1/4" TV mast, available everywhere in 10-foot telescoping sections. The mounts will work well with 1 1/2" booms too. Choice of hole size for No. 8 or No. 10 machine screw. Four sets (to mount four elements) for $1 postpaid in U.S. & Canada. 25¢ for each additional set (to mount 1 element.)

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W6GDO
N167

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